

Air Quality Permit

Issued to:	Advanced Silicon Materials, Inc.	Permit #2940-01
	Butte Operations	Application Complete: 8/19/98
	119140 Rick Jones Way	Preliminary Determination Issued: 9/28/96
	P.O. Box 3466	Department Decision Issued: 10/14/98
	Butte, MT 59702	Final Permit: 10/30/98
		AFS #093-0015

An air quality permit, with conditions, is hereby granted to the above-named permittee, hereinafter referred to as "ASiMI," pursuant to Sections 75-2-204 and 211, MCA, as amended, and Administrative Rules of Montana (ARM) 17.8.701 *et seq.*, as amended, for the following:

Section I: Permitted Facilities

- A. The ASiMI facility consists of a high purity polycrystalline silicon manufacturing plant at 119410 Rick Jones Way near Butte, Montana. The legal description is Section 35, Township 3 North, Range 9 West, Silver Bow County. The plant consists of various boilers and process equipment used in the manufacturing process. A more complete listing of the equipment used at the facility is contained in the permit analysis.

B. Current Permit Action

The current permit action is an alteration of permit #2940-00. The alteration will identify that the scrubber system for the chlorosilane vents has been reconfigured and maintenance emissions may now be routed and controlled by the Maintenance Scrubber (T-1604) and then vented to atmosphere through stack ST-1602. This change is contained in Section II.A.19 and will result in a negligible emissions increase because maintenance emissions are small and infrequent. This alteration also identifies that a neutralized solids bin (EP#126) is proposed to be added to the facility. This bin vents to a baghouse (F-1602) and will have an allowable PM-10 emission limitation of 2 lbs/hr.

In a January 12, 1998, letter to the department, several projects were identified that can be conducted pursuant to ARM 17.8.705(1)(q). These changes are being incorporated into ASiMI's permit at this time and are identified more completely in the permit analysis. In addition, the address on the permit has been changed to the address of the facility now that construction is progressing. Permit #2940-01 will replace permit #2940-00.

SECTION II: Limitations and Conditions

A. Operational Requirements

1. ASiMI shall operate and maintain all emission control equipment as specified in their application for their Montana Air Quality permits and all supporting documentation (ARM 17.8.710).
2. ASiMI shall not cause or authorize to be discharged into the outdoor atmosphere from any source installed after November 23, 1968 emissions that exhibit an opacity of twenty percent (20%) or greater averaged over six (6) consecutive minutes (ARM 17.8.304).

3. ASiMI shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter (ARM 17.8.308).
4. ASiMI shall treat all unpaved portions of the haul roads, access roads, and the general plant area with water and/or chemical dust suppressant as necessary to maintain compliance with the reasonable precautions limitation in Section II.A.3 (ARM 17.8.715).
5. ASiMI shall not cause or allow any emissions of gases, vapors, or odors beyond their property line in such manner as to create a public nuisance and must comply with the provisions of ARM 17.8.315 Odors (ARM 17.8.315).
6. Incoming Metallurgical Grade Silicon processed at the facility shall be limited to 5952 tons/yr on a 12-month rolling time period (ARM 17.8.710).
7. The natural gas consumed at the facility shall be limited to 1,247.77 MMft³/yr on a 12-month rolling time period (ARM 17.8.710).
8. The Hot Oil Heater (H-1201) shall be equipped with low-NOx burners and flue gas recirculation. The emissions from this heater shall not exceed the following limits (ARM 17.8.715):

NOx¹ 1.40 lbs/hr
CO 1.48 lbs/hr
9. The Hot Oil Heater (H-2201) shall be equipped with low-NOx burners and flue gas recirculation. The emissions from this heater shall not exceed the following limits (ARM 17.8.715):

NOx¹ 1.40 lbs/hr
CO 1.48 lbs/hr
10. The emissions from Boiler #1 (EP#113) shall not exceed the following limits (ARM 17.8.715):

NOx¹ 6.48 lbs/hr
CO 8.10 lbs/hr
11. Emissions of PM-10 from the baghouse controlling the Metallurgical Grade Silicon Storage Bins (EP#101A&B) shall each be limited to 0.077 lbs/hr (this includes back-half/impinger catch) (ARM 17.8.715).
12. Emissions of PM-10 from the baghouse controlling the Metallurgical Grade Silicon

¹NOX reported as NO₂

Feed Hopper (EP#102) shall be limited to 0.021 lbs/hr (this includes back-half/impinger catch) (ARM 17.8.715).

13. Emissions of PM-10 from the baghouse controlling the Metallurgical Grade Silicon Feed Hopper (EP#202) shall be limited to 0.021 lbs/hr (this includes back-half/impinger catch) (ARM 17.8.715).
14. Emissions of PM-10 from the cartridge filter controlling the Metallurgical Grade Silicon Lock Hopper (EP#104) shall be limited to 0.017 lbs/hr (this includes back-half/impinger catch) (ARM 17.8.715).
15. Emissions of PM-10 from the cartridge filter controlling the Metallurgical Grade Silicon Lock Hopper (EP#204) shall be limited to 0.017 lbs/hr (this includes back-half/impinger catch) (ARM 17.8.715).
16. Emissions of PM-10 from the baghouse controlling the Lime Storage System (EP#116) shall be limited to 1.20 lbs/hr (this includes back-half/impinger catch) (ARM 17.8.715).
17. Emissions of PM-10 from the baghouse (F-1602) controlling the neutralized solids bin (EP#126) shall be limited to 2.00 lbs/hr (this includes back-half/impinger catch) (ARM 17.8.715).
18. ASiMI shall operate and maintain the Chlorosilane Process Scrubber System (EP#105) to control emissions from the Hydrogenation Section and the Distillation Section of the Silane Area and the Chlorosilane Recovery Area (ARM 17.8.715).
19. Emissions that occur during the annual maintenance shutdown in the Hydrogenation Section and the Distillation Section of the Silane Area shall either be directed to the Maintenance Scrubber System (EP#127 via ST-1602) or to the Chlorosilane Maintenance Scrubber System (EP#105) (ARM 17.8.715).
20. Emissions of PM-10 from EP#105 shall be limited to 0.033 lbs/hr (this includes back-half/impinger catch) (ARM 17.8.715).
21. ASiMI shall operate and maintain the Silane Scrubber System (EP#106) to control emissions from the Silane Storage Section of the Silane Area (ARM 17.8.715).
22. Emissions of PM-10 from the Silane Scrubber System (EP#106) shall be limited to 2.34 lbs/hr (this includes back-half/impinger catch) (ARM 17.8.715).
23. ASiMI shall operate the emergency generators only when commercially supplied electric power is not available or during periods of planned maintenance. ASiMI shall not operate these generators as part of routine operations (ARM 17.8.710).
24. All chlorosilane process equipment pressure safety valves in the Hydrogenation Section and Distillation Section of the Silane Area shall be vented to the Emergency Vent Scrubber (ARM 17.8.710).
25. The use of the Reactor Hydrogen Vent (EP#111) during Silane Area maintenance operations shall not exceed 20 days/year (ARM 17.8.710).

26. ASiMI shall comply with all applicable standards, limitations, and the reporting, record keeping, and notification requirements of 40 CFR Part 60 Subpart Dc for Boiler #1 (ARM 17.8.340).

B. Testing

1. ASiMI shall conduct an initial opacity and PM-10 compliance source test, concurrently, on baghouses EP#101A&B, EP#102, and EP#116 and demonstrate compliance with their emission limitations contained in Section II.A within 1 year of start up of Phase I of the facility (ARM 17.8.105).
2. ASiMI shall conduct an initial opacity and PM-10 compliance source test, concurrently, on baghouse EP#202 and demonstrate compliance with their emission limitations contained in Section II.A within 1 year of start up of Phase II of the facility (ARM 17.8.105).
3. The department may require further testing (ARM 17.8.105).
4. All tests must be completed in compliance with the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106).

C. Operational Reporting Requirement

1. ASiMI shall supply the department with annual production information for all emission points, as required by the department, in the annual emission inventory request. The request will include, but is not limited to, all sources of emissions identified in Section I.B of the permit analysis.

Production information shall be gathered on a calendar-year basis and submitted to the department by the date required in the emission inventory request. Information shall be in units as required by the department.

In addition, ASiMI shall submit the following information annually to the department by March 1st of each year. This information is required for the annual emission inventory, as well as to verify compliance with permit conditions (ARM 17.8.505).

- a. Amount of incoming Metallurgical Grade Silicon processed (tons/yr);
 - b. Annual natural gas consumption from the facility (ft³/yr);
 - c. Number of days the Reactor Hydrogen Vent was used (days/year);
 - d. Hours of operation for the 2500 KW emergency diesel generator (hours/yr); and
 - e. Summary report listing the reasons the 2500 KW emergency generator was operating.
2. ASiMI shall notify the department of any construction or improvement project conducted pursuant to ARM 17.8.705(1)(q) that would change the facility's annual

emission inventory. The notice must be included with the annual emission inventory submitted to the department and must include information sufficient to calculate the facility's estimated actual emissions (17.8.708).

3. Compliance with annual limits shall be determined on a 12-month rolling time period. By the 25th day of each month, ASiMI shall calculate a new 12-month total using the previous 12 months' data (ARM 17.8.710).
4. The records compiled in accordance with this permit shall be maintained by ASiMI as a permanent business record for at least five years following the date of the measurement, shall be submitted to the department upon request, and shall be available at the plant site for inspection by the department (ARM 17.8.710).

D. Notification

ASiMI shall provide the department with written notification of the following dates within the specified time periods:

Actual start-up date of Phase II within 15 days after the actual start up.

- E. The department must be notified promptly by phone whenever a malfunction occurs that can be expected to create emissions in excess of any applicable emission limitation, or to continue for a period greater than 4 hours (ARM 17.8.110).

Section III: General Conditions

- A. Inspection - The recipient shall allow the department's representatives access to the source at all reasonable times for the purpose of making inspections, surveys, collecting samples, obtaining data, auditing any monitoring equipment (CEMS, CERMS) or observing any monitoring or testing, and otherwise conducting all necessary functions related to this permit.
- B. Waiver - The permit and all the terms, conditions, and matters stated herein shall be deemed accepted if the recipient fails to appeal as indicated below.
- C. Compliance with Statutes and Regulations - Nothing in this permit shall be construed as relieving the permittee of the responsibility for complying with any applicable federal or Montana statute, rule or standard, except as specifically provided in ARM 17.8.701, *et. seq.* (ARM 17.8.717).
- D. Enforcement - Violations of limitations, conditions and requirements contained herein may constitute grounds for permit revocation, penalties or other enforcement as specified in Section 75-2-401 *et seq.*, MCA.
- E. Appeals - Any person or persons jointly or severally adversely affected by the department's decision may request, within fifteen (15) days after the department renders its decision, upon affidavit setting forth the grounds therefor, a hearing before the Board of Environmental Review (Board). A hearing shall be held under the provisions of the Montana Administrative Procedures Act. The department's decision on the application is not final unless fifteen (15) days have elapsed and there is no request for a hearing under this section. The filing of a request for a hearing postpones the effective date of the department's decision until the conclusion of the hearing and issuance of a final decision by the Board.

- F. Permit Inspection - As required by ARM 17.8.716, Inspection of Permit, a copy of the air quality permit shall be made available for inspection by department personnel at the location of the permitted source.
- G. Construction Commencement - Construction must begin within three years of permit issuance and proceed with due diligence until the project is complete or the permit shall be revoked.
- H. Permit Fees - Pursuant to Section 75-2-220, MCA, as amended by the 1991 Legislature, failure to pay by the permittee of an annual operation fee may be grounds for revocation of this permit, as required by that Section and rules adopted thereunder by the Board.

Permit Application Analysis
Advanced Silicon Materials Incorporated
Permit #2940-01

I. Introduction

A. Facility History

On June 6, 1996, Advanced Silicon Materials Incorporated (ASiMI) applied for permit #2940-00 proposing to construct and operate a high purity polycrystalline silicon manufacturing plant at 119410 Rick Jones Way near Butte, Montana. This permit was issued final on August 3, 1996. The legal description is Section 35, Township 3 North, Range 9 West, Silver Bow County. ASiMI's facility will be constructed in two phases. Phase I construction will begin in August 1996, with operations of the first phase expected to begin in early 1998. Phase II construction is expected to begin during the second quarter of 1997, with operation of the second phase expected to begin during the second quarter of 1999.

B. Facility Description

The ASiMI facility will produce high purity polycrystalline silicon for the electronics industry by refining metallurgical grade (M.G.) silicon. This facility will be permitted for an incoming raw material feed processing capacity of 5400 metric tons per year of metallurgical grade silicon feed. This will result in a final production capacity of 3850 metric tons per year of polysilicon.

The process areas of the plant are referred to as the Silane Area and the Polyreaction Area. The Silane Area contains three sections: the Hydrogenation Section, the Distillation Section, and the Silane Storage. In the Silane Area-Hydrogenation Section, metallurgical grade silicon is first fed to a pressurized, heated vessel where it reacts with a mixture of hydrogen and chlorosilanes to yield a higher silicon content chlorosilane liquid. This liquid is distilled and catalytically rearranged to yield silane and unconverted chlorosilanes in the Silane Area-Distillation Section. Reclaimed chlorosilanes are recycled back to the initial reactor to react with more metallurgical grade silicon. Silane is an intermediate product from these operations and is transferred into intermediate storage tanks which feed the Polyreaction Area.

The Polyreaction Area consists of large thermal decomposition furnace reactors that are housed in a building which maintains clean room conditions. In the Polyreaction Area the silane is decomposed in heated vessels to yield both a high-purity silicon product and hydrogen. The hydrogen is totally recycled back to the initial reactor in the Silane Area. After cooling, the product silicon is removed in rod form, broken, cleaned, and packaged for shipment.

A listing of the significant emission sources is contained in Table I below. The application contains a complete listing and description of the emission sources proposed to be located at the ASiMI facility.

Table I

STACK IDENTIFIER	SOURCE(S)	SIZE	CONTROL EQUIPMENT
EP#100	M.G. Silicon Bag Unloader (BN-1106) and Unloading Hoppers (BN-1101 through F-1108)		Baghouse - 1000 dscfm
EP#101A	M.G. Silicon Storage Bin Filter Vent (BN-1105A)		Baghouse
EP#101B	M.G. Silicon Storage Bin Filter Vent (BN-1105B)		Baghouse
EP#113	Boiler #1	50.22 MMBtu/hr (natural gas fired)	
EP#114	Boiler #2	6.70 MMBtu/hr (natural gas fired)	
EP#107	Hot Oil Heater	40 MMBtu/hr (natural gas fired)	Low NOx burners w/FGR
EP#207	Hot Oil Heater	40 MMBTU/hr (natural gas fired)	Low NOx burner w/FGR
EP#102	M.G. Silicon Feed Hopper		Baghouse - 245 dscfm
EP#104	M.G. Silicon Lock Hopper		Baghouse - 100 dscfm
EP#116	Lime Storage System		Baghouse - 750 dscfm
EP#118	Cooling Tower	10,400 gpm/cell	
EP#122	Dryer Scrubber Vent		Wet Scrubber (alkaline)
EP#126	Neutralized Solids Bin vent		Baghouse
EP#105	Chlorosilane Scrubber System		Wet Scrubber (alkaline)
EP#106	Silane Scrubber System		Wet Scrubber (alkaline)
EP#127	Maintenance and Emergency Scrubber Vent (ST-1602)		Wet Scrubber
EP#128	Emergency Scrubber Bypass Vent Stack		
EP#129	Process Scrubber System Emergency Bypass Vent Stack		
EP#108-01 to EP#108-50	Reactor Atmos. Vents (TDF-L)		
EP#108-51 to EP#108-58	Reactor Atmos. Vents (TDF-M)		
EP#109-01 to EP#109-50	Reactor Analyzer Vents (TDF-L)		
EP#109-51 to EP#109-58	Reactor Analyzer Vents (TDF-M)		

EP#202	M.G. Silicon Feed Hopper		Baghouse - 245 dscfm
EP#204	M.G. Silicon Lock Hopper		Baghouse - 100 dscfm
EP#111	Hydrogen Vent Stack	20 days/yr	
EP#218	Cooling Tower	10,400 gpm/cell	
	Emergency Generator	2 @ 2000 KW each	
	Emergency Fire Water Pump Diesel Storage	560 gal tank	
	Emergency Generator Diesel Storage	2 - 3000 gal tanks	
	Lab Hood		

C. Current Permitting Action

The current permit action is an alteration of permit #2940-00. The alteration will identify that the scrubber system for the chlorosilane vents has been reconfigured and maintenance emissions may now be routed and controlled by the Maintenance Scrubber (T-1604) and then vented to atmosphere through stack ST-1602. This change is contained in Section II.A.19 and will result in a negligible emissions increase because maintenance emissions are small and infrequent. This alteration also identifies that a neutralized solids bin (EP#126) is proposed to be added to the facility. This bin vents to a baghouse (F-1602) and will have an allowable PM-10 emission limitation of 2 lbs/hr.

In a January 12, 1998, letter to the department, several projects were identified that can be conducted pursuant to ARM 17.8.705(1)(q). These changes are being incorporated into ASiMI's permit at this time and are identified in the equipment list, as appropriate, and more completely in the January 12, 1998, letter from Foster Wheeler USA Corporation and subsequent correspondence. In addition, the address on the permit has been changed to the address of the facility now that construction is progressing. Permit **#2940-01** will replace permit #2940-00.

D. Additional Information

Additional information, such as applicable rules and regulations, BACT determinations, air quality impacts, and environmental assessments, are included in the analysis associated with each change to the permit.

II. Applicable Rules and Regulations

The following are partial explanations of some applicable rules and regulations that apply to the facility. The complete rules are stated in the Administrative Rules of Montana and are available upon request from the department. Upon request, the department will provide references for locations of complete copies of all applicable rules and regulations or copies where appropriate.

A. ARM 17.8, Subchapter 1, General Provisions, including, but not limited to:

1. ARM 17.8.105, Testing Requirements. Any person or persons responsible for the emission of any air contaminant into the outdoor atmosphere shall, upon written request of the department, provide the facilities and necessary equipment, including

instruments and sensing devices, and shall conduct tests, emission or ambient, for such periods of time as may be necessary, using methods approved by the department. The department has determined, for the current permit action, that initial testing is necessary.

2. ARM 17.8.106, Source Testing Protocol. ASiMI shall comply with the requirements contained in the Montana Source Testing Protocol and Procedures Manual. A copy of the manual is available from the department upon request.
3. ARM 17.8.110, Malfunctions. (2) The department must be notified promptly by phone whenever a malfunction occurs that can be expected to create emissions in excess of any applicable emission limitation, or to continue for a period greater than 4 hours.
4. ARM 17.8.111, Circumvention. (1) No person shall cause or permit the installation or use of any device or any means which, without resulting in reduction in the total amount of air contaminant emitted, conceals or dilutes an emission of air contaminant which would otherwise violate an air pollution control regulation. (2) No equipment that may produce emissions shall be operated or maintained in such a manner that a public nuisance is created.

B. ARM 17.8, Subchapter 2, Ambient Air Quality, including, but not limited to:

ARM 17.8.210, Ambient Air Quality Standards for Sulfur Dioxide,
ARM 17.8.211, Ambient Air Quality Standards for Nitrogen Dioxide,
ARM 17.8.212, Ambient Air Quality Standards for Carbon Monoxide,
ARM 17.8.214, Ambient Air Quality Standard for Hydrogen Sulfide,
ARM 17.8.220, Ambient Air Quality Standards for Settled Particulate Matter,

ARM 17.8.223, A

ASiMI must maintain compliance with the applicable ambient air quality standards. ASiMI has submitted modeling for this application that demonstrates compliance with the applicable ambient air quality standards.

C. ARM 17.8, Subchapter 3, Emission Standards, including, but not limited to:

1. ARM 17.8.308, Particulate Matter, Airborne. This section requires an opacity limitation of 20% for all fugitive emission sources and that reasonable precautions be taken to control emissions of airborne particulate matter.
2. ARM 17.8.309, Particulate Matter, Fuel Burning Equipment. This section states that emissions of particulate matter caused by the combustion of fuel shall not exceed the hourly rate set forth in this section.
3. ARM 17.8.315, Emission Standards - Odors. This rule requires that no person shall cause, suffer, or allow any emissions of gases, vapors, or odors beyond his property line in such manner as to create a public nuisance. And a person operating any business or using any machine, equipment, device or facility or process which discharges into the outdoor air any odorous matter or vapors, gases, dusts, or any combination thereof which create odors, shall provide, properly install, and maintain in good working order and in operation such odor control devices or procedures as may be specified by the department.
4. ARM 17.8.322, Sulfur Oxide Emissions-Sulfur in Fuel. Commencing

July 1, 1971, no person shall burn any gaseous fuel containing sulfur compounds in excess of 50 grains per 100 cubic feet of gaseous fuel, calculated as hydrogen sulfide at standard conditions.

5. ARM 17.8.340, Standards of Performance for New Stationary Sources. 40 CFR Part 60 Subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units does apply to Boiler #1 because it was manufactured after June 9, 1989, and both have a heat input greater than 10 MMBtu/hr but less than 100 MMBtu/hr.

40 CFR Part 60, Subpart Dc, Standards of Performance for Small-Industrial-Commercial-Institutional Steam Generating Units, does not apply to Boiler #2 because the boiler has a heat input less than 10 MMBtu/hr.

- D. ARM 17.8, Subchapter 5, Air Quality Permit Application, Operation and Open Burning Fees, including, but not limited to:

1. ARM 17.8.504, Air Quality Permit Application Fees. ASiMI shall submit an air quality permit application fee concurrent with the submittal of an air quality permit application. A permit application is incomplete until the proper application fee is paid to the department. ASiMI has submitted the appropriate permit application fee.
2. ARM 17.8.505, Air Quality Operation Fees. An annual air quality operation fee must, as a condition of continued operation, be submitted to the department by each source of air contaminants holding an air quality permit, excluding an open burning permit, issued by the department; and the air quality operation fee is based on the actual or estimated actual amount of air pollutants emitted during the previous calendar year.

The annual assessment and collection of the air quality operation fee, as described above, shall take place on a calendar-year basis. The department may insert into any final permit issued after the effective date of these rules such conditions as may be necessary to require the payment of an air quality operation fee on a calendar-year basis, including provisions which pro-rate the required fee amount.

- E. ARM 17.8, Subchapter 7, Permit, Construction and Operation of Air Contaminant Sources, including, but not limited to:

1. ARM 17.8.704, General Procedures for Air Quality Preconstruction Permitting. An air quality preconstruction permit shall contain requirements and conditions applicable to both construction and subsequent use.
2. ARM 17.8.705, When Permit Required--Exclusions. This rule requires a facility to obtain an air quality permit or permit alteration if they construct, alter, or use an air contaminant source which has the potential to emit more than 25 tons per year of any pollutant. ASiMI has the potential-to-emit more than 25 tons per year of TSP, PM-10, NOx, and CO.
3. ARM 17.8.706, New or Altered Sources and Stacks, Permit Application Requirements. This rule requires that an application for an air quality permit be submitted for a new or altered source or stack. ASiMI has submitted their application for an air quality permit as required.
4. ARM 17.8.707, Waivers. ARM 17.8.706 requires the permit application be submitted 180 days before construction begins. This rule allows the department to

waive this time limit. The department hereby waives this limit.

5. ARM 17.8.710, Conditions for Issuance of Permit. This rule requires that the source demonstrate compliance with applicable rules and standards before a permit can be issued. The source has demonstrated compliance with applicable rules and standards as required for permit issuance.
 6. ARM 17.8.715, Emission Control Requirements. ASiMI is required to install on the new or altered source the maximum air pollution control capability which is technically practicable and economically feasible. A Best Available Control Technology (BACT) review was conducted for the new or altered source and can be found in Section III.
 7. ARM 17.8.716, Inspection of Permit. This rule requires that air quality permits shall be made available for inspection by the department at the location of the source.
 8. ARM 17.8.717, Compliance with Other Statutes and Rules. This rule requires the permit holder to comply with all other applicable federal and Montana statutes, rules and standards.
 9. ARM 17.8.720, Public Review of Permit Applications. This rule requires that ASiMI notify the public by means of legal publication in a newspaper of general circulation in the area affected by the application of its application for permit. ASiMI has submitted proof of compliance with the public notice requirements.
 10. ARM 17.8.731, Duration of Permit. An air quality permit shall be valid until revoked or modified as provided in this subchapter, except that a permit issued prior to construction of a new or altered source may contain a condition providing that the permit will expire unless construction is commenced within the time specified in the permit, which in no event may be less than one year after the permit is issued.
 11. ARM 17.8.733, Modification of Permit. An air quality permit may be modified for changes in any applicable rules and standards adopted by the board or changed conditions of operation at a source or stack which do not result in an increase in emissions because of the changed conditions of operation. A source may not increase its emissions beyond those found in its permit unless the source applies for and receives another permit.
- F. ARM 17.8, Subchapter 8, Prevention of Significant Deterioration of Air Quality, including, but not limited to:
- ARM 17.8.801, Definitions. ASiMI is not defined as a "major stationary source" because it does not have the potential to emit more than 250 tons of any pollutant.
- G. ARM 17.8, Subchapter 12, Operating Permit Program, including, but limited to:
1. ARM 17.8.1201, Definitions. (23) Major Source under Sec. 7412 of the Federal Clean Air Act (FCAA) is defined as any stationary source having:
 - a. PTE > 10 tons/year of any one HAP, or
 - b. PTE > 25 tons/year of a combination of all HAPS, or
 - c. PTE > 100 tons/year of any pollutant.

- d. Sources with the PTE > 70 tons/year of PM-10 in a serious PM-10 nonattainment area.

2. ARM 17.8.1204, Air Quality Operating Permit Program Applicability.

Title V of the CAA of 1990 requires that all sources, as defined in ARM 17.8.1204 (1), obtain a Title V Operating Permit. In reviewing and issuing air quality permit #2940-01 for ASiMI's facility the following conclusions were made:

- a. The emission limitations and conditions set in the permit will limit criteria pollutant emissions to less than 100 tons per year.
- b. The emission limitations and conditions set in the permit will limit HAP emissions to less than 10 tons/year of any one HAP, and less than 25 tons/year of a combination of all HAPS.
- c. The source is not located in a serious PM-10 nonattainment area.
- d. The facility is not subject to any current NESHAP standards.
- e. The source is not a Title IV affected source nor a solid waste combustion unit.
- f. The source is not an EPA designated Title V source.

Therefore, ASiMI's facility is not subject to Title V Operating Permit requirements.

III. Best Available Control Technology Analysis

A Best Available Control Technology (BACT) determination is required for each new or altered source. ASiMI shall install on the new or altered source the maximum air pollution control capability which is technically practicable and economically feasible, except that Best Available Control Technology shall be utilized.

A BACT analysis was reviewed by the department for permit application #2940-01 addressing some available methods of controlling emissions from the neutralized solids bin vent. ASiMI is proposing to control emissions from the neutralized solids bin vent with a baghouse. Because baghouses offer some of the highest control efficiencies for particulate, no other control technologies need to be considered. Therefore, the department has determined that the proper operation of a baghouse in compliance with the emission limitation contained in the permit, constitutes BACT for this source.

The control options that have been selected have controls and control costs similar to other recently permitted similar sources and are capable of achieving the appropriate emission standards.

IV. Emission Inventory

Emission Inventory -- #2940-01 High Purity Polycrystalline Silicon Manufacturing

	TSP	PM-10	Tons/Year		VOC	CO
			SOx	NOx		
Boilers < 10 MMBtu/hr	0.09	0.09	0.02	2.94	0.16	0.59
All Boilers > 10 MMBtu/hr	2.20	2.20	0.22	26.39	3.52	32.99
Natural Gas Hot Oil Heaters	4.20	4.20	0.21	12.26	0.98	12.96

M.G. Silicon Storage Bins		0.34	0.34			
M.G. Silicon Feed Hopper		0.09	0.09			
M.G. Silicon Lock Hopper		0.08	0.08			
Lime Storage System	5.27	5.27				
Cooling Tower		4.07	4.07			
Chlorosilane Scrubber System	0.07	0.07				
Silane Scrubber System		0.43	0.43			
Reactor Atmos. Vents	13.37	13.37				
Reactor Analyzer Vents		0.16	0.16			
Nuet. Solids Bin		8.76	8.76			
M.G. Silicon Feed Hopper		0.09	0.09			
M.G. Silicon Lock Hopper		0.08	0.08			
Chlorosilane Scrubber System	0.07	0.07				
Silane Scrubber System		0.21	0.21			
Hydrogen Vent Stack	8.28	8.28				
Cooling Tower		4.07	4.07			
Emergency Generator	0.72	0.47	5.41	30.80	0.97	7.04
Total		52.65	52.40	5.86	72.39	5.63
						53.58

Boilers < 10 MMBtu/hr

Boiler #2

EP#114

N.G. Heat Value	1000	Btu/ft**3				
Total Heat		6.7	MMBtu/hr			
Fuel Consumed	58.7	MMft**3/yr				
TSP Emissions						
Emission Factor:	3.00	lbs/MMft**3	{AFSSCC 1-02-006-03}			
Control Efficiency:	0.0%					
Fuel Consumption:	58.7	MMft**3/yr	(Maximum Consumption)			
Calculations:	58.7	MMft**3/yr*3.00 lbs/MMft**3*0.0005 ton/lb =				0.09 tons/yr
PM-10 Emissions:						
Emission Factor:	3.00	lbs/MMft**3	{AFSSCC 1-02-006-03}			
Control Efficiency:	0.0%					
Fuel Consumption:	58.7	MMft**3/yr	(Maximum Consumption)			
Calculations:	58.7	MMft**3/yr*3.00 lbs/MMft**3*0.0005 ton/lb =				0.09 tons/yr
NOx Emissions:						
Emission Factor:	100.00	lbs/MMft**3	{AFSSCC 1-02-006-03}			
Control Efficiency:	0.0%					
Fuel Consumption:	58.7	MMft**3/yr	(Maximum Consumption)			
Calculations:	58.7	MMft**3/yr*100 lbs/MMft**3*0.0005 ton/lb =				2.94 tons/yr
VOC Emissions:						
Emission Factor:	5.30	lbs/MMft**3	{AFSSCC 1-02-006-03}			
Control Efficiency:	0.0%					
Fuel Consumption:	58.7	MMft**3/yr	(Maximum Consumption)			
Calculations:	58.7	MMft**3/yr*5.30 lbs/MMft**3*0.0005 ton/lb =				0.16 tons/yr
CO Emissions:						
Emission Factor:	20.00	lbs/MMft**3	{AFSSCC 1-02-006-03}			
Control Efficiency:	0.0%					
Fuel Consumption:	58.7	MMft**3/yr	(Maximum Consumption)			
Calculations:	58.7	MMft**3/yr*20 lbs/MMft**3*0.0005 ton/lb =				0.59 tons/yr
SOx Emissions:						
Emission Factor:	0.60	lbs/MMft**3	{AFSSCC 1-02-006-03}			
Control Efficiency:	0.0%					
Fuel Consumption:	58.7	MMft**3/yr	(Maximum Consumption)			
Calculations:	58.7	MMft**3/yr*0.6 lbs/MMft**3*0.0005 tons/lb =				0.02 tons/yr

All Boilers > 10 MMBtu/hr

Boiler #1

EP#113

N.G. Heat Value	1000	Btu/ft**3
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Total Heat	50.22	MMBtu/hr		
Fuel Consumed	440	MMft**3/yr		
TSP Emissions				
Emission Factor:	0.01	lbs/MMBtu	{Manufacturer's Information}	
Control Efficiency:	0.0%			
Firing Rate:	50.22	MMBtu/hr	(Maximum Firing Rate)	
Calculations:	50.22	MMBtu/hr*0.01	lbs/MMBtu *8760 hrs/yr*0.0005 ton/lb =	2.20 tons/yr
PM-10 Emissions:				
Emission Factor:	0.01	lbs/MMBtu	{Manufacturer's Information}	
Control Efficiency:	0.0%			
Firing Rate:	50.22	MMBtu/hr	(Maximum Firing Rate)	
Calculations:	50.22	MMBtu/hr*0.01	lbs/MMBtu *8760 hrs/yr*0.0005 ton/lb =	2.20 tons/yr
NOx Emissions:				
Emission Factor:	0.120	lbs/MMBtu	{Manufacturer's Information}	
Control Efficiency:	0.0%			
Fuel Consumption:	50.22	MMBtu/hr	(Maximum Firing Rate)	
Calculations:	50.22	MMBtu/hr*0.120	lbs/MMBtu *8760*0.0005 ton/lb =	26.39 tons/yr
VOC Emissions:				
Emission Factor:	0.016	lbs/MMBtu	{Manufacturer's Information}	
Control Efficiency:	0.0%			
Fuel Consumption:	50.22	MMBtu/hr	(Maximum Firing Rate)	
Calculations:	50.22	MMBtu/hr*0.016	lbs/MMBtu *8760*0.0005 ton/lb =	3.52 tons/yr
CO Emissions:				
Emission Factor:	0.15	lbs/MMBtu	{Manufacturer's Information}	
Control Efficiency:	0.0%			
Fuel Consumption:	50.22	MMBtu/hr	(Maximum Firing Rate)	
Calculations:	50.22	MMBtu/hr*0.15	lbs/MMBtu *8760*0.0005 ton/lb =	32.99 tons/yr
SOx Emissions:				
Emission Factor:	0.001	lbs/MMBtu	{Manufacturer's Information}	
Control Efficiency:	0.0%			
Fuel Consumption:	50.22	MMBtu/hr	(Maximum Firing Rate)	
Calculations:	50.22	MMBtu/hr*0.001	lbs/MMBtu *8760*0.0005 tons/lb =	0.22 tons/yr

Natural Gas Hot Oil Heaters H-1201 & H-2201 EP#107 & EP#207

TSP Emissions				
Emission Factor:	0.012	lbs/MMBtu	{Manufacturer's Information}	
Control Efficiency:	0.0%		(LOW NOX BURNERS &FGR)	
Firing Rate:	80.00	MMBtu/hr	(Maximum Firing Rate)	
Calculations:	80.00	MMBtu/hr*0.012	lbs/MMBtu *8760 hrs/yr*0.0005 ton/lb =	4.20 tons/yr
PM-10 Emissions:				
Emission Factor:	0.012	lbs/MMBtu	{Manufacturer's Information}	
Control Efficiency:	0.0%		(LOW NOX BURNERS &FGR)	
Firing Rate:	80.00	MMBtu/hr	(Maximum Firing Rate)	
Calculations:	80.00	MMBtu/hr*0.012	lbs/MMBtu *8760 hrs/yr*0.0005 ton/lb =	4.20 tons/yr
NOx Emissions:				
Emission Factor:	0.035	lbs/MMBtu	{Manufacturer's Information}	
Control Efficiency:	0.0%		(LOW NOX BURNERS &FGR)	
Fuel Consumption:	80.00	MMBtu/hr	(Maximum Firing Rate)	
Calculations:	80.00	MMBtu/hr*0.035	lbs/MMBtu *8760*0.0005 ton/lb =	12.26 tons/yr
VOC Emissions:				
Emission Factor:	0.0028	lbs/MMBtu	{Manufacturer's Information}	
Control Efficiency:	0.0%		(LOW NOX BURNERS &FGR)	
Fuel Consumption:	80.00	MMBtu/hr	(Maximum Firing Rate)	
Calculations:	80.00	MMBtu/hr*0.0028	lbs/MMBtu *8760*0.0005 ton/lb =	0.98 tons/yr
CO Emissions:				
Emission Factor:	0.037	lbs/MMBtu	{Manufacturer's Information}	
Control Efficiency:	0.0%		(LOW NOX BURNERS &FGR)	
Fuel Consumption:	80.00	MMBtu/hr	(Maximum Firing Rate)	
Calculations:	80.00	MMBtu/hr*0.037	lbs/MMBtu *8760*0.0005 ton/lb =	12.96 tons/yr

SOx Emissions:

Emission Factor:	0.0006	lbs/MMBtu	{Manufacturer's Information}	
Control Efficiency:	0.0%			
Fuel Consumption:	80.00	MMBtu/hr	(Maximum Firing Rate)	
Calculations:	80.00	MMBtu/hr*0.0006 lbs/MMBtu	*8760*0.0005 tons/lb =	0.21 tons/yr

PHASE I EMISSION SOURCES

M.G. Silicon Storage Bins EP#101A&B

PM Emissions

Emission Factor:	0.02	gr/dscf (Baghouse Control)	
Baghouse Flow:	450	dscfm	
Calculations:	0.02	gr/dscf * 450 dscfm * 60 *8760*1lb/7000gr=	676 lbs/yr
		676 lbs/yr * 0.0005 tons/lb =	0.34 tons/yr

PM-10 Emissions

Emission Factor:	0.02	gr/dscf (Baghouse Control & Assume 100% PM-10)	
Baghouse Flow:	450	dscfm	
Calculations:	0.02	gr/dscf * 450 dscfm * 60 *8760*1lb/7000gr=	676 lbs/yr
		676 lbs/yr * 0.0005 tons/lb =	0.34 tons/yr

M.G. Silicon Feed Hopper EP#102

PM Emissions

Emission Factor:	0.02	gr/dscf (Baghouse Control)	
Baghouse Flow:	122.5	dscfm	
Calculations:	0.02	gr/dscf * 122.5 dscfm * 60 *8760*1lb/7000gr=	184 lbs/yr
		184 lbs/yr * 0.0005 tons/lb =	0.09 tons/yr

PM-10 Emissions

Emission Factor:	0.02	gr/dscf (Baghouse Control & Assume 100% PM-10)	
Baghouse Flow:	122.5	dscfm	
Calculations:	0.02	gr/dscf * 122.5 dscfm * 60 *8760*1lb/7000gr=	184 lbs/yr
		184 lbs/yr * 0.0005 tons/lb =	0.09 tons/yr

M.G. Silicon Lock Hopper EP#104

PM Emissions

Emission Factor:	0.02	gr/dscf (Baghouse Control)	
Baghouse Flow:	100	dscfm	
Calculations:	0.02	gr/dscf * 100 dscfm * 60 *8760*1lb/7000gr=	150 lbs/yr
		150 lbs/yr * 0.0005 tons/lb =	0.08 tons/yr

PM-10 Emissions

Emission Factor:	0.02	gr/dscf (Baghouse Control & Assume 100% PM-10)	
Baghouse Flow:	100	dscfm	
Calculations:	0.02	gr/dscf * 100 dscfm * 60 *8760*1lb/7000gr=	150 lbs/yr
		100 lbs/yr * 0.0005 tons/lb =	0.08 tons/yr

Lime Storage System EP#116

PM Emissions

Emission Factor:	0.187	gr/dscf (Baghouse Control)		Baghouse Flow:
Calculations:	0.187	gr/dscf * 750 dscfm * 60 *8760*1lb/7000gr=	10,530 lbs/yr	
		10,530 lbs/yr * 0.0005 tons/lb =		5.27 tons/yr

PM-10 Emissions

Emission Factor:	0.187	gr/dscf (Baghouse Control & Assume 100% PM-10)	
Baghouse Flow:	750	dscfm	
Calculations:	0.187	gr/dscf * 750 dscfm * 60 *8760*1lb/7000gr=	10,530 lbs/yr
		10,530 lbs/yr * 0.0005 tons/lb =	5.27 tons/yr

Cooling Tower EP#118

PM Emissions

Circulation Rate:	10400.00 gpm/cell	
Max Drift:	0.005%	
Total Dissolved Solids:	1200 ppm	
Calculations:	10400 gpm*500 lb/hr/gpm*0.005%*1200*10-6= 0.31*3 cells*8760*0.0005=	0.31 lbs/hr/cell 4.07 tons/yr

PM-10 Emissions

Circulation Rate:	10400.00 gpm/cell	
Max Drift:	0.005%	
Total Dissolved Solids:	1200 ppm	
Calculations:	10400 gpm*500 lb/hr/gpm*0.005%*1200*10-6= 0.31*3 cells*8760*0.0005=	0.31 lbs/hr/cell 4.07 tons/yr

Chlorosilane Scrubber System EP#105

PM Emissions

TPY SiO2 Formed:	72.70 tons/yr	(From Permit Application, 6/6/96)
Control:	99.90%	(WET SCRUBBER)
Calculations:	72.7* (1-0.999)=	0.07 tons/yr

PM-10 Emissions

TPY SiO2 Formed:	72.70 tons/yr	(From Permit Application, 6/6/96)
Control:	99.90%	(WET SCRUBBER)
Calculations:	72.7* (1-0.999)=	0.07 tons/yr

Silane Scrubber System EP#106

PM Emissions

TPY Silane:	23.00 tons/yr	(From Permit Application, 6/6/96)
Control:	99.00%	(WET SCRUBBER)
Calculations:	23* (1-0.99)*1.87=	0.43 tons/yr

PM-10 Emissions

TPY Silane:	23.00 tons/yr	(From Permit Application, 6/6/96)
Control:	99.00%	(WET SCRUBBER)
Calculations:	23* (1-0.99)*1.87=	0.43 tons/yr

Reactor Atmos. Vents EP#108-01 through EP#108-50 for TDF-L EP#108-51 through EP#108-58 for TDF-M

PM Emissions

TDF-L Reactors:	9486*0.0005=	4.74 tons/yr
TDF-M Reactors:		
Calculations:	21.8 lb SiO2*8 reactors*99 cycles/reactor/yr= 17265.6*0.0005=	17265.6 lbs SiO2/yr 8.63 tons/yr
TOTAL:		13.37 tons SiO2/yr

PM-10 Emissions

TDF-L Reactors:		
Calculations:	5.58 lb SiO2*50 reactors*34 cycles/reactor/yr= 9486*0.0005=	9486 lbs SiO2/yr 4.74 tons/yr
TDF-M Reactors:		
Calculations:	21.8 lb SiO2*8 reactors*99 cycles/reactor/yr= 17265.6*0.0005=	17265.6 lbs SiO2/yr 8.63 tons/yr
TOTAL:		13.37 tons SiO2/yr

Reactor Analyzer Vents

EP#109-01 through EP#109-50 for TDF-L
EP#109-51 through EP#109-58 for TDF-M

PM Emissions

TDF-L Reactors:		
Calculations:	50 reactors*4.67 lbs/yr/reactor= 233.5*0.0005=	233.5 lbs SiO2/yr 0.12 tons/yr
TDF-M Reactors:		

Calculations:	8 reactors*9.31 lbs/yr/reactor= 74.48*0.0005=	74.48 lbs SiO ₂ /yr 0.04 tons/yr 0.16 tons SiO ₂ /yr
TOTAL:		
PM-10 Emissions		
TDF-L Reactors:		
Calculations:	50 reactors*4.67 lbs/yr/reactor= 233.5*0.0005=	233.5 lbs SiO ₂ /yr 0.12 tons/yr
TDF-M Reactors:		
Calculations:	8 reactors*9.31 lbs/yr/reactor= 74.48*0.0005=	74.48 lbs SiO ₂ /yr 0.04 tons/yr 0.16 tons SiO ₂ /yr
TOTAL:		
Neutralized Solids Bin Vent	EP#126	
PM Emissions		
Calculations:	2.00 lb/hr*8760 hr/yr*.0005 ton/lb=	8.76 tons/yr
PM-10 Emissions		
Calculations:	2.00 lb/hr*8760 hr/yr*.0005 ton/lb=	8.76 tons/yr

PHASE II EMISSION SOURCES

M.G. Silicon Feed Hopper EP#202

PM Emissions

Emission Factor:	0.02 gr/dscf	(Baghouse Control)	
Baghouse Flow:	122.5 dscfm		
Calculations:	0.02 gr/dscf * 122.5 dscfm * 60 * 8760 * 1lb/7000gr=	184 lbs/yr	
	184 lbs/yr * 0.0005 tons/lb =		0.09 tons/yr

PM-10 Emissions

Emission Factor:	0.02 gr/dscf	(Baghouse Control & Assume 100% PM-10)	
Baghouse Flow:	245 dscfm		
Calculations:	0.02 gr/dscf * 245 dscfm * 60 * 8760 * 1lb/7000gr=	184 lbs/yr	
	184 lbs/yr * 0.0005 tons/lb =		0.09 tons/yr

M.G. Silicon Lock Hopper EP#204

PM Emissions

Emission Factor:	0.02 gr/dscf	(Baghouse Control)	
Baghouse Flow:	100 dscfm		
Calculations:	0.02 gr/dscf * 100 dscfm * 60 * 8760 * 1lb/7000gr=	150 lbs/yr	
	150 lbs/yr * 0.0005 tons/lb =		0.08 tons/yr

PM-10 Emissions

Emission Factor:	0.02 gr/dscf	(Baghouse Control & Assume 100% PM-10)	
Baghouse Flow:	100 dscfm		
Calculations:	0.02 gr/dscf * 100 dscfm * 60 * 8760 * 1lb/7000gr=	150 lbs/yr	
	100 lbs/yr * 0.0005 tons/lb =		0.08 tons/yr

Chlorosilane Scrubber System EP#105

PM Emissions

TPY SiO ₂ Formed:	72.70 tons/yr	(From Permit Application, 6/6/96)	
Control:	99.90%	(WET SCRUBBER)	
Calculations:	72.7*(1-0.999)=		0.07 tons/yr

PM-10 Emissions

TPY SiO ₂ Formed:	72.70 tons/yr	(From Permit Application, 6/6/96)	
Control:	99.90%	(WET SCRUBBER)	
Calculations:	72.7*(1-0.999)=		0.07 tons/yr

Silane Scrubber System EP#106

PM Emissions
 TPY Silane: 11.30 tons/yr (From Permit Application, 6/6/96)
 Control: 99.00% (WET SCRUBBER)
 Calculations: $11.3 * (1 - 0.99) * 1.87 =$ 0.21 tons/yr

PM-10 Emissions
 TPY Silane: 11.30 tons/yr (From Permit Application, 6/6/96)
 Control: 99.00% (WET SCRUBBER)
 Calculations: $11.3 * (1 - 0.99) * 1.87 =$ 0.21 tons/yr

Hydrogen Vent Stack EP#111
 PM Emissions
 Calculations: 34.5 lb/hr*24hr/day*20days/yr*.0005= 8.28 tons SiO₂/yr

PM-10 Emissions
 Calculations: 34.5 lb/hr*24hr/day*20days/yr*.0005= 8.28 tons SiO₂/yr

Cooling Tower EP#218
 PM Emissions
 Circulation Rate: 10400.00 gpm/cell
 Max Drift: 0.005%
 Total Dissolved Solids: 1200 ppm
 Calculations: $10400 \text{ gpm} * 500 \text{ lb/hr/gpm} * 0.005\% * 1200 * 10^{-6} =$ 0.31 lbs/hr/cell
 $0.31 * 3 \text{ cells} * 8760 * 0.0005 =$ 4.07 tons/yr

PM-10 Emissions
 Circulation Rate: 10400.00 gpm/cell
 Max Drift: 0.005%
 Total Dissolved Solids: 1200 ppm
 Calculations: $10400 \text{ gpm} * 500 \text{ lb/hr/gpm} * 0.005\% * 1200 * 10^{-6} =$ 0.31 lbs/hr/cell
 $0.31 * 3 \text{ cells} * 8760 * 0.0005 =$ 4.07 tons/yr

Emergency Generator
 TSP Emissions
 Emission Factor: 0.3253 gr/kw-hr {AP-42 Table 3.4-5}
 Design Capacity 4000.00 kw
 Hours of Operation: 500.00 hrs/yr (EPA PTE Policy)
 Calculations: $0.3253 \text{ gr/kw-hr} * 4000.00 \text{ kw} * 500 \text{ hrs/yr} * .0022 * 0.0005 =$ 0.72 tons/yr

PM-10 Emissions
 Emission Factor: 0.2116 gr/kw-hr {AP-42 Table 3.4-5}
 Design Capacity 4000.00 kw
 Hours of Operation: 500.00 hrs/yr (EPA PTE Policy)
 Calculations: $0.2116 \text{ gr/kw-hr} * 4000.00 \text{ kw} * 500 \text{ hrs/yr} * .0022 * 0.0005 =$ 0.47 tons/yr

NOx Emissions
 Emission Factor: 14.00 gr/kw-hr {AP-42 Table 3.4-2}
 Design Capacity 4000.00 kw
 Hours of Operation: 500.00 hrs/yr (EPA PTE Policy)
 Calculations: $14.0000 \text{ gr/kw-hr} * 4000.00 \text{ kw} * 500 \text{ hrs/yr} * .0022 * 0.0005 =$ 30.80 tons/yr

VOC Emissions
 Emission Factor: 0.44 gr/kw-hr {AP-42 Table 3.4-2}
 Design Capacity: 4000.00 kw
 Hours of Operation: 500.00 hrs/yr (EPA PTE Policy)
 Calculations: $0.4400 \text{ gr/kw-hr} * 4000.00 \text{ kw} * 500 \text{ hrs/yr} * .0022 * 0.0005 =$ 0.97 tons/yr

CO Emissions
 Emission Factor: 3.20 gr/kw-hr {AP-42 Table 3.4-2}
 Design Capacity 4000.00 kw
 Hours of Operation: 500.00 hrs/yr (EPA PTE Policy)
 Calculations: $3.2000 \text{ gr/kw-hr} * 4000.00 \text{ kw} * 500 \text{ hrs/yr} * .0022 * 0.0005 =$ 7.04 tons/yr

SOx Emissions
 Emission Factor: 2.46 gr/kw-hr {AP-42 Table 3.4-2 & Assume 0.5% S}
 Design Capacity 4000.00 kw
 Hours of Operation: 500.00 hrs/yr (EPA PTE Policy)

Calculations: $2.4600 \text{ gr/kw-hr} * 4000.00 \text{ kw} * 500 \text{ hrs/yr} * .0022 * 0.0005 = 5.41 \text{ tons/yr}$

V. Air Quality Impacts

The area in and around Butte is currently a nonattainment area for previous violations of the PM-10 standards. Foster Wheeler USA Corporation, on behalf of ASiMI, conducted ambient air quality modeling for the proposed permitting action. The model demonstrated that the proposed changes will not cause a violation of the NAAQS or a significant impact on the nonattainment area. Therefore, it is expected that ASiMI's facility will continue to operate in compliance with the ambient standards

VI. Taking or Damaging Implication Analysis

As required by 2-10-101 through 105, MCA, the department has conducted a private property taking and damaging assessment and has determined there are no taking or damaging implications.

VII. Environmental Assessment

An environmental assessment, required by the Montana Environmental Policy Act, was completed for this project. A copy is attached.

DEPARTMENT OF ENVIRONMENTAL QUALITY
Permitting and Compliance Division
Air and Waste Management Bureau
P.O. Box 200901, Helena, Montana 59620-0901
(406) 444-3490

FINAL ENVIRONMENTAL ASSESSMENT (EA)

Issued For: Advanced Silicon Materials Inc.
Butte Operations
119140 Rick Jones Way
P.O. Box 3466
Butte, MT 59702

Permit Number: 2940-01

Preliminary Determination on Permit Issued: September 28, 1998
Department Decision Issued: October 14, 1998
Final Permit Issued: October 30, 1998

Montana Environmental Policy Act (MEPA) Compliance: An environmental assessment, required by MEPA, was completed for this project as follows.

Legal Description: Section 35, Township 3 North, Range 9 West, Silver Bow County, Montana.

Description of Project: The current permit action is an alteration of permit #2940-00. The alteration will identify that the scrubber system for the chlorosilane vents has been reconfigured and maintenance emissions will now be routed and controlled by the Maintenance Scrubber (T-1604) and then vented to atmosphere through stack ST-1602. This change is contained in Section II.A.20 and will result in a negligible emissions increase because maintenance emissions are small and infrequent. This alteration also identifies that a neutralized solids bin (EP#126) is proposed to be added to the facility. This bin vents to a baghouse (F-1602) and will have an allowable PM-10 emission limitation of 2 lbs/hr.

Benefits and Purpose of Proposal: This permit alteration will allow ASiMI the operational flexibility it needs to conduct its operation.

Description and analysis of reasonable alternatives whenever alternatives are reasonably available and prudent to consider: The department has reviewed a Best Available Control Technology (BACT) analysis as part of this permitting action. The BACT analysis can be found in Section III of the permit analysis.

A listing and appropriate evaluation of mitigation, stipulations and other controls enforceable by the agency or another government agency: A listing of the enforceable permit conditions and a permit analysis is contained in permit #2940-01.

Description and analysis of regulatory impacts on private property rights: The department has considered alternatives to the conditions imposed in this permit as part of the permit development. The department has determined that the permit conditions are reasonably necessary to ensure compliance with applicable requirements and demonstrate compliance with those requirements and do not unduly restrict private property rights.

Potential Impact on Physical Environment

		Major	Moderate	Minor	None	Unknown	Comments
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1	Terrestrial and Aquatic Life and Habitats			X			yes
2	Water Quality, Quantity and Distribution			X			yes
3	Geology and Soil Quality, Stability and Moisture			X			yes
4	Vegetation Cover, Quantity and Quality				X		yes
5	Aesthetics				X		yes
6	Air Quality			X			yes
7	Unique Endangered, Fragile or Limited Environmental Resource				X		yes
8	Demands on Environmental Resource of Water, Air and Energy			X			yes
9	Historical and Archaeological Sites				X		yes
10	Cumulative and Secondary Impacts			X			yes

Potential Impact on Human Environment

		Major	Moderate	Minor	None	Unknown	Comments
1	Social Structures and Mores				X		yes
2	Cultural Uniqueness and Diversity				X		yes
3	Local and State Tax Base and Tax Revenue			X			yes
4	Agricultural or Industrial Production			X			yes
5	Human Health			X			yes
6	Access to and Quality of Recreational and Wilderness Activities				X		yes
7	Quantity and Distribution of Employment				X		yes
8	Distribution of Population				X		yes
9	Demands for Government Services			X			yes
10	Industrial and Commercial Activity			X			yes
11	Locally Adopted Environmental Plans and Goals				X		yes
12	Cumulative and Secondary Impacts			X			yes

Potential Impact on Physical Environment

1. There may be impacts to terrestrial and aquatic life and habitats from the increase in allowable emissions. However, any impacts will be minor because this permit only allows a small increase in permitted emissions.
2. There may be impacts on the water quality, quantity, and/or distribution as a result of this permitting action. However, any impacts will be minor because this permitting action only allows a small number of sources with a minimal impact to the facility.
3. There will be no additional impacts to the geology and soil quality, stability and moisture as a result of this permitting action.
4. There will be no additional impacts to the vegetation cover, quantity, and quality as a result of this permitting action.
5. There will be no additional impacts to the aesthetics of the area from this permitting action.
6. There may be impacts to the air quality of the area from the increase in allowable emissions. However, any impacts will be minor because this permit only allows a small increase in permitted emissions.
7. There will be no additional impacts to any unique endangered, fragile, or limited environmental resource as a result of this permitting action.
8. There may be an increase in the demand on air, water, and energy resources as a result of the increase in allowable emissions. However, any impact would be minor because of the small increase in permitted allowable emissions and because the new equipment added under this permit are insignificant in impact compared to the rest of the facility.
9. There will be no additional impacts to historical and archeological sites as a result of this permitting action.
10. There may be cumulative and secondary impacts from the increase in allowable emissions. However, any impacts should be minor because this permit only allows a small increase in permitted emissions. In addition, the environmental assessment completed for the entire facility demonstrated that there would not be a significant impact from its operation.

Potential Impact on Human Environment

1. There will be no additional impact to any social structure or mores as a result of this permitting action.
2. There will be no additional impact to the cultural uniqueness and diversity as a result of this permitting action.
3. There will be a minor impact to the local and state tax base and tax revenue as a result of this permitting action because new equipment will be purchased and installed.
4. There may be a minor impact to the agricultural and industrial production as a result of the new equipment installed as a result of this permitting action.
5. There may be impacts to human health from the increase in allowable emissions. However, any impacts will be minor because this permit only allows a small increase in permitted emissions and the permit analysis demonstrates that ASiMI can be expected to operate in compliance with all applicable

standards.

6. There will be no additional impact to the access to and quality of recreational and wilderness activities as a result of this permitting action.
7. There will be no additional impact to the quantity and distribution of employment as a result of this permitting action.
8. There will be no additional impact to the distribution of population as a result of this permitting action.
9. There may be an impact on the demand for government services as a result of this permitting action because of the inspection and permitting activities pertaining to the new equipment and the facility. However, because this is an existing facility with a large number of emission sources, and additional impact from this permitting action will be minor.
10. There may be a minor increase in the industrial and commercial activity as a result of this permitting action.
11. There will be no additional impact to the locally adopted environmental plans and goals as a result of this permitting action.
12. There may be cumulative and secondary impacts from the increase in allowable emissions. However, any impacts should be minor because this permit only allows a small increase in permitted emissions. In addition, the environmental assessment completed for the entire facility demonstrated that there would not be a significant impact from its operation.

Recommendation: An EIS is not required.

If an EIS is not required, explain why the EA is an appropriate level of analysis: The source is applying the Best Available Control Technology; the analysis indicates compliance with all applicable air quality rules and regulations. The emissions and associated ambient impacts from this permitting action will be minimal.

Other groups or agencies contacted or which may have overlapping jurisdiction: None

Individuals or groups contributing to this EA: Department of Environmental Quality - Permitting and Compliance Division.

EA prepared by: David Klemp

Date: September 25, 1998